

A NOTE ON THE BUTTERFLIES AND HAWK-MOTHS
OF KATHIAWAR

(With special reference to the Bhavnagar State.)

BY

LIEUT.-COL. A. H. MOSSE, I.A., F.Z.S.

Alike in the Society's Journal and in the usual text-books, any mention of the not inconsiderable Province of Kathiawar, as a locality for *Lapidoptera*, is conspicuous by its absence. A note on the results of some two years' recent collecting therein will therefore, I hope, be of interest.

As was to be expected, the butterflies found are mainly those of North Gujarat, though perhaps the most interesting find is that of the occurrence on the western shore of the Gulf of Cambay of the desert species *Arphritis* (*Aphnæus*) *acamas hypargyros*, not hitherto recorded, I believe, south of Cutch. The Gir Jungles of Junagadh, which I have not had the opportunity of working, may produce a few additional species, otherwise, although my collecting has been almost entirely confined to the Bhavnagar State, in the south-east of the Province, I do not think many additions to my list of the regular inhabitants of Kathiawar are very probable. I have adopted the order and nomenclature of Evans' recent work. As regards Moths, I have attempted to deal only with the *Sphingidæ*.

BUTTERFLIES

PAPILIONIDÆ.

1. *Byasa aristolochiæ*. Abundant, especially in July, October and February but to be seen almost the whole year round. I have estimated the numbers feeding, one October morning, on the flowers of antigonon along a palisade some sixty yards in length, at not less than 400—a delightful spectacle. The habit of this butterfly of feeding especially in the morning and evening is well known, but it may often be seen at flowers at any time of day. I know no other butterfly which keeps such long hours: I have not infrequently met with it on the wing before the sun was up and again have watched it at dusk on the blossoms of a flowering tree, loth to bring its supper to an end, long after the hawk-moths were out. I may mention a male specimen, taken in November, in which the white discal markings of the hind wing are centred with pink.

2. *Papilio polytes*. Fairly common. The *romulus* form of female, while scarcer than the *polytes* form, is not infrequently found, although *B. hector*, which it mimics, does not occur. I have bred a couple of males of the *cyrus* form in which the submarginal lunules of the hind wing underside are large and of a deep red, those in spaces 1, 2 and 4 being reproduced, though smaller, on the upper side. These were cold weather specimens. It is remarkable what small eaters the larvæ of this species are and how slow their growth in the cold weather, just as much so in a state of nature as in captivity. One individual, hatched from the egg on 18th December, did not attain the pupal stage until 8th February. It sometimes feeds, like the larva of *P. demoleus*, upon lime, but the favourite food plant is the shrub known as the 'curry nim' which *P. demoleus*, in my experience, does not affect.

3. *Papilio demoleus*. Abundant, on the wing most months of the year.

4. *Pathysa nomius*. In May 1928, observed at close quarters, though I did not succeed in taking it, an undoubted specimen of this species, in a fruit garden at Mahuva on the sea coast, some sixty miles S. by W. of Bhavnagar.

5. *Zetides agamemnon*. Fairly common at Mahuva but not seen in Bhavnagar. I have taken it at Rajkot. The tails in Kathiawar specimens are long.

PIERIDÆ.

6. *Delias eucharis*. All over Kathiawar where there are good sized trees but nowhere common. Frequents flowering trees, especially in February, not often seen in the monsoon.

7. *Belenois mesentina*. Very common.

8. *Huphina nerissa*. Common, but less widely distributed than No. 7. Marked variation between W. S. and D. S. forms.

9. *Appias libythea*. Local in distribution, but not rare, though nowhere numerous. The males are given to hovering about the food plant, which I take to be a species of caper, upon which I have also found the larvæ of *B. mesentina* and *Colotis fausta*. The females almost invariably have the upper portion of the abdomen red, as noted by the late Col. Macpherson of Mt. Abu specimens: this is the colour of the abdomen itself, which is bare of scales, and fades in preserved specimens. In the only female which I have bred, the colour of the abdomen on first emergence was green; unfortunately this specimen was accidentally destroyed the same day, so I cannot say whether the green would have changed to red.

10. *Catopsilia crocale*. Common, larvæ on *Cassia fistula*.

11. *Catopsilia pomona*. Comparatively scarce in Bhavnagar, less so at Mahuva. I have not met with the *var. catilla*.

12. *Catopsilia pyranthe*. Abundant, especially June to August.

13. *Catopsilia florella*. Common, especially in October. I have some observations to make on the question of the maintenance of specific distinction between this and the last named species but these had better be reserved for a separate note which will follow this one.

14. *Terias libythea*. Somewhat rare. The few specimens that I have come across have been between October and March.

15. *Terias venata*. Common from end of June to September: none in the dry season.

16. *Terias laeta*. Common. Found from mid-September to early June. I have recently, in a separate note, described my discovery of the larvæ of this and the last species and discussed the probability—which I believe to be a definite fact—of their being seasonal variations of a single species.

17. *Terias hecabe*. Very common. In Kathiawar I find the underside markings of monsoon specimens are never rust coloured but always blackish as they often are in the dry season also. The usual variations occasionally occur in a diminution of and change of shape in the black markings of forewing and absence of one or both of the cell spots on underside of forewing; one specimen is practically devoid of any markings beneath. One male, taken at Mahuva, has the ground colour a very pale clear yellow, almost cream colour.

18. *Ixias marianne*. Common. The pre-apical orange patch enters the cell in male DSF as well as WSF specimens. In female DSF the black bordering the orange patch on the inner side is completely interrupted between veins 2 and 4—as in *var. nola*—and in some specimens, both D and WSF, there is a decided yellow suffusion over the ground colour.

19. *Ixias pyrene*. Common at Mahuva. I have seen it at Kundla, not far from the eastern borders of the Gir, but nowhere else in the Province. Female always, in my experience, of the white form.

20. *Colotis amata*. Common. I watched a female ovipositing on the underside of a leaf of *Salvadora persica*. She took about eight minutes to lay four eggs, then flew round the plant, returning to the same spot after three or four minutes to make further additions to her prospective family. Have not come across the white form of female.

21. *Colotis vestalis*. Local in distribution and not common.

22. *Colotis fausta fausta*. Fairly common. Normal female of a definitely more orange colour than the pinker tint of the male. Some specimens (female only) approach the *fulvia* form in having the black apical area of the upper forewing more or less enclosed and nearly reaching to tornus. Three females taken of the white form with more or less salmon effusion, in all these the black apical area extends to tornus.

23. *Colotis etrida*. Very common, varies considerably in size.

24. *Colotis danae*. Common in places, but not so generally distributed as *etrida*.

DANAIDÆ.

25. *Danais limniace*. Fairly common.
 26. *Danais plexippus*. Common.
 27. *Danais chrysippus*. Abundant, to be seen all the year round.
D. chrysippus var. *alcippoides*. 3 specimens taken in Bhavnagar.
D. chrysippus var. *dorippus*. 5 specimens taken in Bhavnagar and Mahuva and one in Rajkot.
 28. *Euplœa core*. Rare in 1927, fairly common in 1928.

SATYRIDÆ.

29. *Ypthima asterope mahratta*. Common.
 30. *Melanitis leda*. Common.

NYMPHALIDÆ.

31. *Charaxes fabius*. Local. Have taken it at Bhavnagar, Mahuva and Rajkot, imbibing exudations from the branches of certain trees—orange, acacia and 'dhak'.

32. *Euthalia nais*. Rare. I have only found it in two places in the Bhavnagar State, frequenting dry stony stream-beds in hilly country.

33. *Hypolimnas misippus*. Very common.

Hypolimnas misippus var. *inaria* (♀). Four specimens taken at Bhavnagar and Mahuva and one at Wadhwan.

34. *Hypolimnas bolina*. Common. I took one interesting female 'deformity' in which the right forewing was considerably smaller than the left, although in itself perfectly proportioned.

35. *Precis hierla*. Very common.

36. *Precis orithya*. Very common.

37. *Precis lemonias*. Very common.

The larvæ of *hierla* and *lemonias* are very much alike and feed on the same plant, but the former is distinguishable by iridescent blue specks at the base of the spines—a point which I have not seen mentioned in descriptions I have read.

38. *Precis almana*. Fairly common, but much less abundant than the three above.

39. *Precis iphita*. A single specimen at Kuda on the coast, twenty miles south of Bhavnagar, seen but not taken. I fancy this must have been a wind-blown wanderer, I have never seen another in Kathiawar or North Gujarat.

40. *Vanessa cardui*. Common.

41. *Argynis hyperbius hyperbius*. A single male taken and another seen in February 1929 at Kundla, near the western border of Bhavnagar State. I do not know if there is any previous record of this species south of Mount Abu, until the *castelsi* form is met with in South India; but I may mention that a number of years ago I saw several females one monsoon at Sadra, thirty miles north of Ahmedabad.

42. *Aiella phalanta*. Met with now and then, but not common.

43. *Byblia ilithyia*. Common.

44. *Ergolis ariadne*. Fairly common in Bhavnagar, but much less generally distributed than No. 43 although it shares the same food plant.

45. *Telchinia violæ*. Fairly common in Bhavnagar in 1927, less so in 1928. It may be observed that this is certainly not a district of heavy rainfall though Bingham appears to think this species is confined to such.

LYCÆNIDÆ.

46. *Castalius rosimon*. A single specimen taken at Mahuva in February 1928.

47. *Tarucus theophrastus*. Very common.

48. *Euchrysops cnejus*. Very common, especially in the monsoon.

49. *Euchrysops contracta*. Common

50. *Everes parrhadius*. Several specimens taken at Mahuva, rare elsewhere.

51. *Chilades laius*. Common wherever there are lime trees.

52. *Zizera trochilus putli*. Fairly common.

53. *Zizera lysimon*. Fairly common.
 54. *Zizera gaika*. Very common.
 55. *Zizera otis*. Very common.
 56. *Syntarucus plinius*. Common.
 57. *Catachrysois strabo*. Rare in the monsoon, not uncommon in some places in the dry season, but I have never seen it in any numbers.
 58. *Nacaduba nora*. A single specimen at Rajkot in December 1927.
 59. *Jamides bochus*. Not rare in dry season when its cheery brilliancy attracts attention.
 60. *Azanus ubaldus*. Common.
 61. *Azanus jesous*. Fairly common about babul trees in the Victoria Park at Bhavnagar during the monsoon.
 62. *Curetis thetis*. Five specimens of female taken at different seasons at Mahuva. I have not come across a single male.
 63. *Apharitis acamas hypargyros*. Two specimens taken in November 1928 and five more in March 1929 on sand dunes on the coast at Kuda near Bhavnagar. As already remarked, this is much farther south than any previous record, so far as I am aware.
 64. *Spindasis vulcanus*. Common. Monsoon females have the tornal orange patch of hind wing upperside extended to form a marginal band of varying completeness.
 65. *Sindasis ictis*. Common at Mahuva, less so elsewhere.
 66. *Virachola isocrates*. Not uncommon where there are pomegranate trees. Is attracted by lucerne.
 67. *Rapala melampus*. Not common.

HESPERIDÆ

68. *Hasora alexis*. Found in some numbers on a flowering tree on the eastern borders of the Gir in August 1928; otherwise rather rare.
 69. *Badania exclamationis*. A few specimens in 1928, none seen in 1927.
 70. *Sarangesa sati*. One specimen taken and another seen in Bhavnagar.
 71. *Hesperia galba*. Fairly common.
 72. *Suastrus grenius*. Not rare in dry season.
 73. *Udaspes tolus*. A single specimen at Mahuva in February 1928.
 74. *Padraona dara*. Bhavnagar, not common.
 75. *Baoris mathias*. Common.
 76. *Baoris zelleri colaca*. Fairly common.
 77. *One species not identified*. Two specimens in March 1929, Bhavnagar.
 78. *One Lycaenid not identified*, taken at Kuda in March 1929.

HAWK-MOTHS

SPHINGIDÆ

1. *Acherontia styx*. Common. The abdominal stripe which Hampson describes as grey or grey-blue is a very definite blue in Western India specimens of this and the following species. The larva, which I have found on several plants and shrubs, notably on 'til', has, in the later stages, pronounced blue stripes above the oblique lateral yellow ones—the latter are white in the earlier stages—and is therefore not to be distinguished from the larva of *A. lachesis* by absence of the former, as stated by Hampson. A brown form occurs not infrequently. The egg is small for the size of the moth.
 2. *Acherontia lachesis*. I have bred a single specimen from a larva found at Rajkot.
 3. *Polyptychus dentatus*. Common. The colouring of the larva, described by Hampson, occurs, but in the normal form the back is of a uniform bright green, with no touch of pink or yellow, the sides a paler dull green, and the oblique side stripes indistinct. An interesting feature is the prolongation of the head to a conspicuous point above, in the intermediate stages only; this does not exist before the first moult and disappears again in the last stage.
 4. *Leucophlebia emittens*. One specimen taken at Mahuva and a second at Wadhwan. Hampson's remark as to the dusky brown of the type specimen being due to discolouration is, I think, mistaken, as, in my Mahuva specimen, the magenta pink of the Wadhwan example is replaced by a dark brownish purple on the upperside.

3. *Clanis (Ambulyx)* sp. In the year 1919 I bred a moth at Rajkot which I sent to the Society with a description of the larva: this was forwarded to Mr. Bell who pronounced it a new species akin to *Clanis phalaris*. I should be interested to know what became of this specimen and whether it was ever named¹ or identified. I never succeeded in obtaining another.

6. *Cherocampa alecto*. Not uncommon at Rajkot and Bhavnagar. Hampson's description of the larva is incorrect as regards Kathiawar specimens, in that the ocelli succeeding a larger one on the fourth somite are of equal size and do not decrease posteriorly; the centres of these ocelli have a mauve patch above the green. It feeds, along with the larvæ of *celerio*, *butus* and *oldenlandiæ* on a vine-like creeper with rough surfaced leaves which is common in prickly-pear hedges; also found on the grape-vine, as are *celerio* and *butus*. A form of the larva occurs in which the ground colour, instead of being green, varies from pink to brownish purple.

7. *Cherocampa theylia*. Very common.

8. *Cherocampa celerio*. Common. *Vide* my note on the larva in vol. xv of the *Journal*, page 133: the description there given holds good in Kathiawar.

9. *Cherocampa oldenlandiæ*. Fairly common, but less so than the last two; it does not appear to come to flowers so freely as they do. One of its food plants is the common garden balsam.

10. *Cherocampa butus*. Not uncommon.

11. *Daphnis nerii*. Common. I bred three abnormal specimens at Rajkot in 1926 in which there was a marked deficiency, not of pigment, but of the usual coloured scales. This was specially so on the forewings which were consequently almost devoid of the normal green colouring and of markings, with the result of a dull brown and semi-transparent effect. I deduce some hereditary defect as all three emerged on the same day from the pupæ of larvæ taken together and presumably belonged to a single brood, while others bred at the same time and under the same conditions were quite normal.

12. *Dilephila livornica*. Not uncommon at Bhavnagar, rarer at Rajkot.

13. *Protoparce convolvuli*. Common.

14. *Pseudosphinx discistriga*. Common. The larva feeds on two of the same plants as *Acherontia styx* which it resembles in the early stages. But conversely to the case of *A. styx*, the oblique side stripes—there is no blue—change from yellow in the penultimate to white in the final stage; the horn at the tail, also, though crenulate, does not curl like that of *Acherontia*.

15. *Nephele hespera*. Common.

16. *Macroglossa gyrans*. Common.

17. *Macroglossa belis*. Mahuva, not common.

18. *Cephonodes hylas*. Not uncommon.

In connection with larvæ of the *Sphingidæ*, has any explanation ever been suggested of the frequent occurrence in some species of a brown form where the normal ground colour is green? This phenomenon is perhaps most often found in *Cherocampa*, but it occurs also in *Acherontia* and *Protoparce* and probably others. In the English *C. elpenor* the young green caterpillar may be found by day on the young leaves of willow-herb at the top of the plant, while in the later brown stages it is said usually to prefer resting near the root by day, emerging only to feed at night. Thus its colouring would seem to change in conformity with its habits. But this does not apply to the *Cherocampidæ* or to *Acherontia* in India where the change from green to brown, when it occurs, may take place either at an early or a late stage, while the adult larva does not habitually retire to the neighbourhood of the ground by daylight. The normal larva of *C. oldenlandiæ*, clad, in the early stages, in velvety black with orange ocelli, is a conspicuous object on the young balsam leaves: the inconspicuous green form is rare. In other species, such as *alecto* and *celerio*, the green form is the normal one. Possibly the situation of larva at the time of moulting, in respect of light and shade, may affect the tendency to change colour as, in captivity, a larger proportion of the two last named species affect the brown colouring in the later stages than appears to be the case out of doors.

¹The specimen in question was identified at the British Museum in July 1920, as *Clanis phalaris*. EDS.